Application Note
Low-Level Programming of Model 618/619/718/719 Smart A/D Boards

PCI Identifiers

- Vendor ID is `0x10B5`.
- Device ID is `0x9050`.
- SubVendor ID is `0x6000`.
- SubDevice ID is the Smart A/D model number in decimal.

PCI Regions

These boards each have three PCI regions (I/O spaces) that can be identified by their sizes:

- `MemBase` (256 bytes) contains a data buffer (offset `0`) and command buffer (offset `0xF0`).
- `IoBase` (32 bytes) returns board status information.
- `CfgBase` (128 bytes) is used for reset control.

Command/Data Buffers

Unlike other Smart A/D products which utilize discrete command/data registers, these boards employ regions of local RAM to serve as command buffer (`CMDBUF`) and data buffer (`DATBUF`). These buffers act as dual-port RAM; they are accessed by both the local CPU and by the host through the PLX device:

- `DATBUF` is allocated 32 bytes starting at `MemBase`.
- `CMDBUF` is allocated 16 bytes starting at `MemBase+0xF0`.

Status Register

A status register (`HOST_STATUS`), located at `IoBase+0x1C`, has the following bit flags:

- `STAT_CRMT` (`0x80`) indicates `CMDBUF` may be written into by the PCI master.
- `STAT_DAV` (`0x40`) indicates `DATBUF` has content that may be read by the PCI master.
- `STAT_FAULT` (`0x10`) indicates that either (1) the local CPU is being reset, or (2) a fault condition exists on the board.

Reset Control

Board reset is invoked by writing these four values, in sequence, to `CfgBase+0x50`:

- `0x40684042L`
- `0x00684042L`
- `0x02684042L`
- `0x00684042L`

After invoking a board reset, the driver should wait for `STAT_FAULT` to clear before proceeding.

Handshake Control

A handshake control register (`MEM_HANDSHAKE`), located at `MemBase+0xEB`, controls command/data handshake.

The PCI master sends a command to the board by following this sequence:

- Wait for `STAT_CRMT` to become active.
- Write the command string to `CMDBUF`.
- Write 0 to `MemBase+MEM_HANDSHAKE` to release the command for execution.

The PCI master fetches data from the board by following this sequence:

- Wait for `STAT_DAV` to become active.
- Read the data string from `DATBUF`.
- Read (and discard) from `MemBase+MEM_HANDSHAKE` to reset `STAT_DAV`.

Commands

These boards all employ the same command set as model 518. Refer to the Model 518 Instruction Manual for command details.

Additional Information

Refer to ClsPci.cpp (included in SDK-18, the standard distribution media for all Smart A/D products) for example code that shows how to communicate with these boards.